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PROGRESS

of the

Barberry Eradication Campaign

in

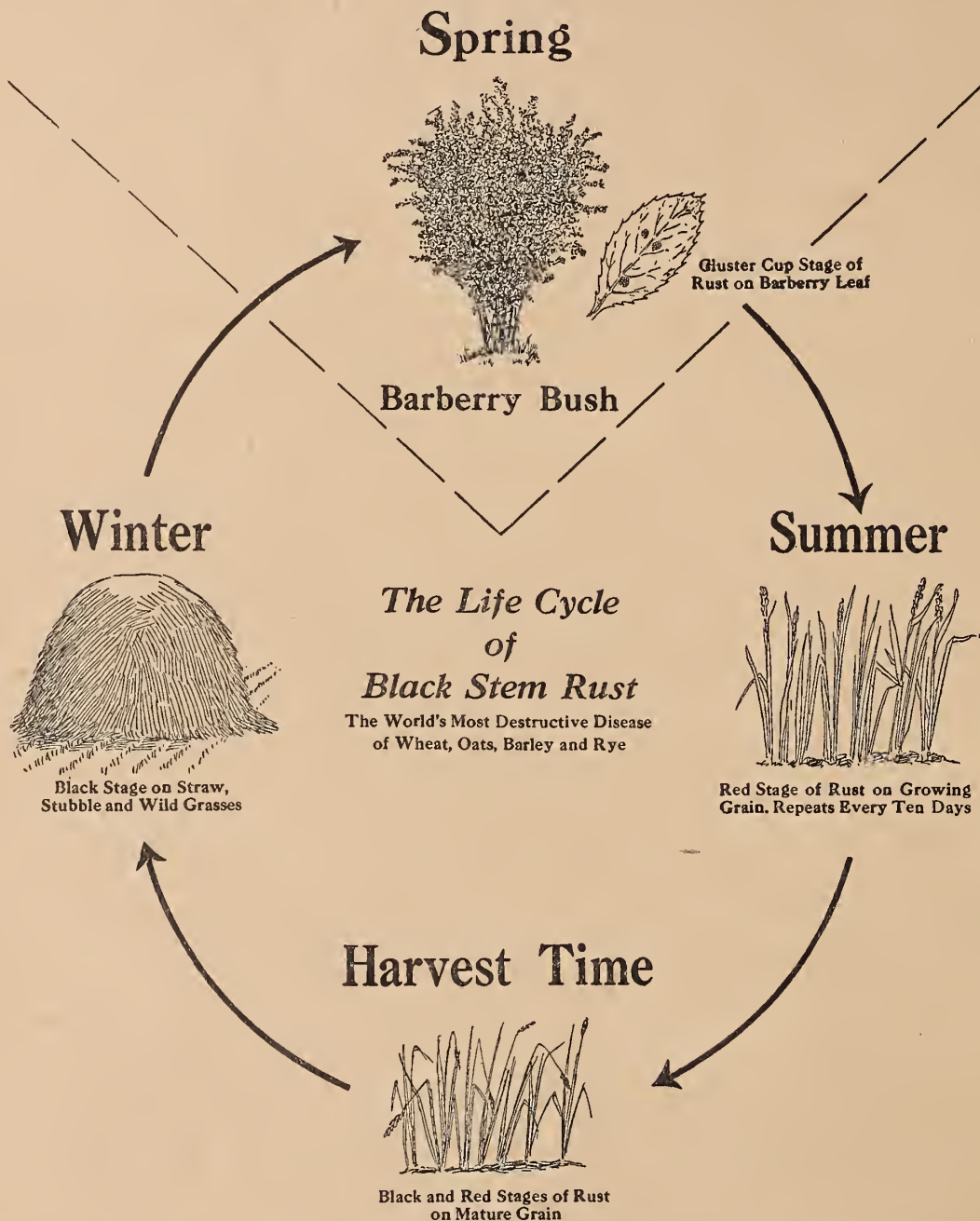
INDIANA in 1929



Our Grain Crops Must Be Protected from Black Stem Rust

Barberry Eradication Pays

Remove the Barberry and Break the Rust Cycle



All Common Barberries act as starting points for Black Stem Rust early each spring. By destroying the barberry the early spring source of black stem rust is eliminated. The Common Barberry provides a means to bridge the gap between the black stage on grain in the fall and the red stage of the rust on grains and grasses the following spring.

**BOOST BARBERRY ERADICATION—A PRACTICAL RUST
CONTROL MEASURE**

PROGRESS OF THE BARBERRY ERADICATION CAMPAIGN
IN INDIANA, 1929

By Wayne E. Leer, Agent, 1/

Office of Barberry Eradication, 2/ Bureau of Plant Industry,

United States Department of Agriculture

Introduction

Rusts are among the most serious enemies of the small-grain crops. They cause some damage every year, and in epidemic years the losses are appalling. Each kind of grain may be attacked by more than one kind of rust. The rusts that cause the most serious damage to the small-grain crops of Indiana are black stem rust, orange leaf rust, and crown rust. Each is different and has its own peculiar habits of growth. Most cereal rusts spend a part of their lives on one host plant and another part on a different host plant. Black stem rust develops in the spring on the leaves of the common barberry and spreads from there to small grains and grasses. For more than 250 years people in various countries have destroyed the common barberry in an effort to control black stem rust. The present barberry-eradication campaign in the United States was started in 1918, not because of any new discoveries, but because of the increasing number of common barberry bushes and the increasing severity of black stem rust in Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming.

Although the work has been in progress only 12 years, the losses from black stem rust are being noticeably reduced. The United States Department of Agriculture has estimated the annual loss of wheat from black stem rust in the States of the barberry-eradication area for the five-year period from 1915 to 1919, inclusive, at about 50,000,000 bushels; for the five-year period from 1920 to 1924, inclusive, at about 26,000,000 bushels; and for the five-year period from 1925 to 1929, inclusive, at about 12,000,000 bushels. While other control measures, such as the use of rust-resistant varieties, proper fertilization of the soil, and improved cultural methods have been of assistance, it is believed that barberry eradication has played a most important role in bringing about this reduction in stem-rust losses.

Organization, Finance, and Personnel

The barberry-eradication campaign in Indiana is directed by the Office of Barberry Eradication, Bureau of Plant Industry, United States Department of Agriculture, with a State Leader supervising the activities within the State.

1/ State Leader of Barberry Eradication in Indiana.

2/ From the beginning of the campaign in 1918 until January 1, 1930, barberry eradication was a project of the Office of Cereal Crops and Diseases, of the Bureau of Plant Industry. On January 1, 1930, the Office of Barberry Eradication was established as a separate unit of the Bureau.

It is a cooperative project with the Purdue University Agricultural Extension Department, and the State Leader acts in close cooperation with the Extension Division of the Botany Department of Purdue University, where permanent headquarters is maintained.

Funds for barberry eradication in Indiana are furnished by the Federal Government through the United States Department of Agriculture. Although no actual cash has been appropriated by the State of Indiana for barberry eradication, much indirect aid in the form of office space, storage, heat, light, drayage, and personal service has been given by the staffs of the Agricultural Experiment Station, the Agricultural Extension Department, the School of Agriculture, and other departments of Purdue University. In addition, three different State publications have been printed by the University to aid the campaign in Indiana. The campaign also has been given the support and cooperation of the whole educational system of the State, the State Conservation Commission, and other agencies. The value of this support and cooperation can not be measured in terms of dollars and cents.

The Conference for the Prevention of Grain Rust, of Minneapolis, Minn., which is composed of representatives of agricultural and allied interests, cooperates very closely in carrying on the campaign in this State.

Approximately 18 field agents are employed each year from about June 15 to September 15. They are selected by the State Leader with the approval of the Director of the Purdue University Agricultural Extension Department and the United States Department of Agriculture. No man is employed who has not had actual farm experience. Before going into the field, all field agents are given special training and instruction relative to the present status of the barberry-eradication campaign, methods of survey, fiscal matters, and the handling of situations not strictly pertaining to barberry eradication.

Survey Activities

Survey activities were started in Indiana in 1918 with an inspection of yards, parks, and cemeteries in the cities and larger towns. It was soon learned, however, that barberries were to be found in the rural districts as well as in towns and cities. It became necessary to make a farm-to-farm survey to locate these rural plantings. The first or preliminary farm-to-farm survey was started in August, 1919, and was completed in November, 1924. It was very important to destroy the largest number of bushes in the shortest possible time, thus preventing them from spreading rust and eliminating the possibility of further seed distribution.

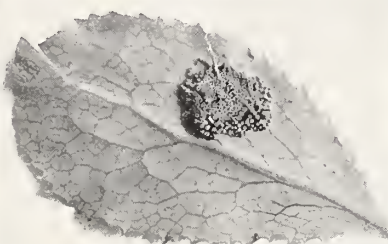
As this preliminary survey progressed, more startling facts relative to the distribution of common barberries were learned. Authentic reports were received of barberry bushes that were more than 100 years old. It also was found that birds scattered seeds along fence rows, under trees, along stream banks, and in almost every conceivable place where bushes could possibly grow.

BLACK STEM RUST SPREADS FROM COMMON BARBERRIES



to Wheat, Oats, Barley, Rye and other Grasses.

Black Stem Rust as it appears on the leaves of the Common Barberry



Enlarged single leaf



Plump healthy grain



Shriveled rusted grain

DANGEROUS NEIGHBORS



Common Barberry Bushes growing near grain fields

Report Common Barberry bushes you may find to your State Leader of Barberry Eradication.



Common Barberry is harmful, destroy



Japanese Barberry is harmless, do not destroy



Escaped or "wild" barberry bushes were discovered in all parts of the State.

A second and more intensive survey was started in Indiana in the spring of 1925. A county is considered the largest working unit in this State, and every fence row, stream bank, pasture, and woodlot, in fact, every place where a barberry bush can possibly grow, is thoroughly inspected before the field force moves on to another county.

A resurvey is a reinspection of a property on which barberries previously have been dug, treated with chemicals, or otherwise eradicated. These resurveys are made at regular intervals in order that sprouts and seedlings from root fragments or seeds of the original bush may be found and destroyed. More than one resurvey is necessary for complete eradication because sprouts and more especially seedlings are difficult to locate when they are small. Furthermore, barberry seeds may remain dormant for many years, then germinate and grow into vigorous seedling bushes. Resurveys must be frequent enough to prevent sprouts and seedlings from growing into fruiting bushes, and must be continued until the danger from dormant seed has passed.

Eradication

Because of the vast areas of escaped or "wild" bushes, there arose a need for a cheap, effective, and time-saving method of eradication. Digging, which was practiced until 1923, was found difficult, expensive, and ineffective, as every root fragment left in the ground sent up sprouts. Digging was out of the question in many of the areas of escaped bushes where the barberries were growing from under rocks, between rocks, and mingled with the roots of trees and other bushes. Experiments with about 40 different chemicals revealed three that were cheap and effective; salt, kerosene, and sodium arsenite. Sodium arsenite proved to be dangerous to livestock, and its use has been discontinued. Salt and kerosene are highly recommended for eradicating common barberry bushes. The use of chemicals has been a tremendous help to the campaign. The relatively few bushes not killed by the treatment of salt or kerosene were found to have been improperly treated. Care must be used in the application of both. The base of every shoot must be treated. While the quantity of either chemical necessary to kill a bush will vary according to the size of the bush, 25 pounds of salt or a gallon of kerosene poured into the crown of a bush 12 inches in diameter at the base will usually kill the bush.

All Known Methods of Rust Control Must Be Employed

While barberry eradication is of first importance, there are several known methods for reducing losses due to stem rust. Early sowing of grain, proper preparation of the seed bed, avoidance of low, poorly drained land, proper use of fertilizers, in fact, anything that promotes early ripening of the grain, will help to reduce damage from rust.

Certain varieties of wheat, oats, and barley which are more disease-resistant than others have been produced by plant breeders. Wherever these varieties meet the requirements of a given region and are desirable from the standpoints of yield, milling quality, and resistance to other cereal diseases, they should be substituted for the less satisfactory varieties.

New Strains of Destructive Black Stem Rust Develop on the Common Barberry

The production of rust-resistant varieties of grains probably will be much more successful when all common barberry bushes have been eradicated. The reason for this is shown in the recent important discoveries made in the Canadian Rust Research Laboratories at Winnipeg and by E. C. Stakman and his coworkers at the University of Minnesota. Both of these groups, conducting independent research, have proved that entirely new strains of the destructive black stem rust are produced if two different forms of the rust cross-breed on the barberry leaves. The certainty that new forms of the dangerous disease may appear suddenly, makes the eradication of the common barberry all the more imperative, since it is on the barberry alone that this crossing can occur in nature. The new and apparently resistant varieties of grains are not safe with barberries near. If for no other reason than to protect the new kinds of superwheat which are now in the process of being developed, all common barberry bushes should be destroyed.

Education and Publicity Activities

The highest degree of efficiency in the field can be obtained only after the public has a thorough understanding of the project. The person who does not know that common barberry spreads black stem rust can not be an active supporter of the campaign, but the well-informed person welcomes the arrival of the field agents in his community and gladly aids them in their work. It often has been said that the immediate success of the campaign depends primarily upon the personnel of the organization, whereas, the ultimate value of the campaign will depend to a very large degree on the success attained in the field of education and publicity.

Through the splendid cooperation of the State Superintendent of Public Instruction, the various county superintendents of public instruction, and the hundreds of teachers throughout the State, it has been possible to conduct a well-organized educational program in Indiana. Educational materials have been made available to every school in the State to teach the children how to recognize the common barberry and how it spreads black stem rust, how to find the places where common barberry grows, and what to do in case they find bushes. Instruction concerning barberry eradication should begin early and continue through the entire school career, if much is to be accomplished.

The aim of publicity is to create friendly and intelligent cooperation. The press, demonstrations, and group meetings are the readily accessible means to accomplish this end. News articles are published weekly during the survey season to keep the public informed regarding the progress of the work and to discuss from a more or less scientific point of view such important matters as spreads of black stem rust from common barberry, the identification of these bushes, places where they grow, and methods of killing them.

Window displays and demonstrations at fairs and conventions have been prepared wherever feasible. Specimens of the harmful common barberry and the



FLOWERS
(yellow)

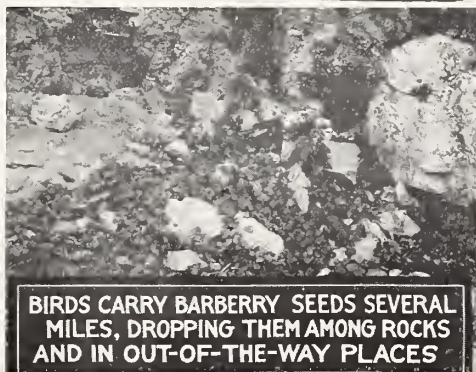


BERRIES
(bright red)

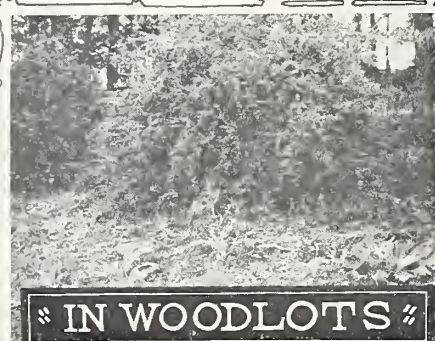
Where Barberry Bushes Grow



IN DOORYARDS



BIRDS CARRY BARBERRY SEEDS SEVERAL MILES, DROPPING THEM AMONG ROCKS AND IN OUT-OF-THE-WAY PLACES



IN WOODLOTS



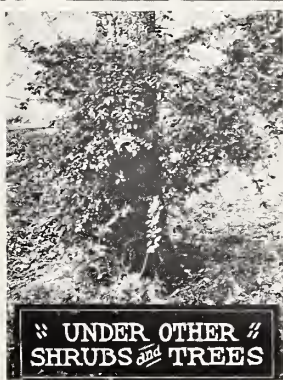
ON ROCKY HILLSIDES



Barberries spread by birds



AS HEDGE FENCES



UNDER OTHER
SHRUBS and TREES





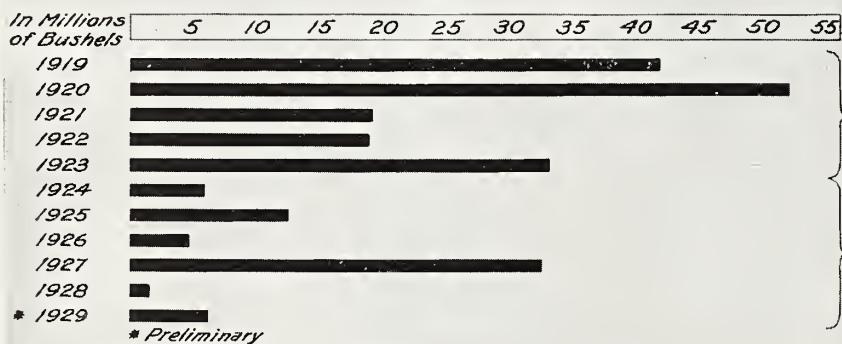
Salting a bush



Sprouts from a dug bush

Common Salt Kills Barberry Bushes and Prevents Sprouting

Wheat Losses in Barberry Eradication Area, 1919-1929



The average annual loss for the first five year period, 1919 to 1923, was approximately 33,000,000 bushels.

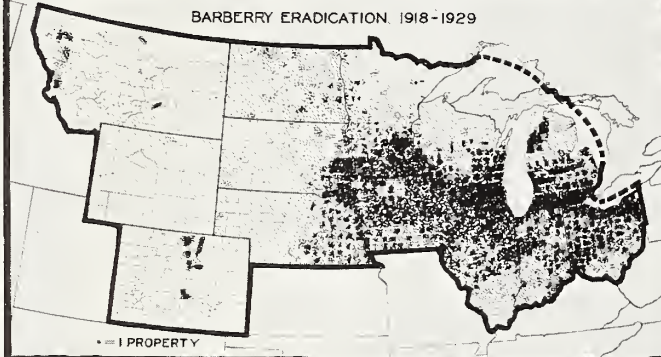
The average annual loss for the next six year period, 1924 to 1929, was approximately 10,500,000 bushels.

The losses to small grain crops caused by black stem rust have been reduced since the beginning of the barberry eradication campaign in 1918. The breeding of rust-resistant varieties, the use of early maturing varieties, and the sowing of crops early, have aided barberry eradication in this reduction.

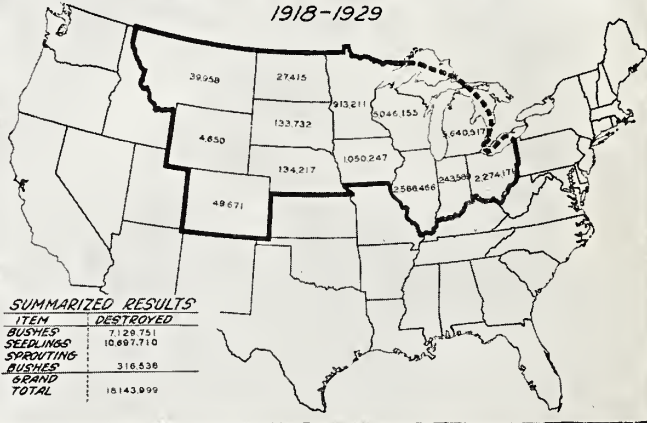
"BARBERRY ERADICATION PAYS"

RURAL PROPERTIES ON WHICH BARBERRY BUSHES WERE FOUND-ALL SURVEYS

BARBERRY ERADICATION, 1918-1929



NUMBERS OF BARBERRY BUSHES AND SEEDLINGS DESTROYED 1918-1929



harmless Japanese barberry are used in all demonstrations to show their distinguishing characteristics. As far as possible, only one idea is emphasized in any one demonstration. The policy in Indiana has been, more demonstrations and fewer ideas in each one.

Barberry eradication has been discussed at meetings of county agents and of teachers of vocational agriculture, at boys' and girls' club camps, at Izaak Walton League meetings, and at other meetings throughout the State. Lantern slides and movie films have aided greatly in these discussions.

Summary

Barberry eradication was started in Indiana only 12 years ago. A preliminary survey of the State has been completed, and a second, much more intensive survey has been started. So far 200,419 bushes have been found on 5,272 properties. Of this number 106,912 were escaped bushes, found on 471 properties. Educational materials have been made available to every school in the State. All of the county superintendents of public instruction have been personally interviewed by the State Leader to secure their cooperation. News articles have been published weekly in the counties being surveyed. Demonstrations have been placed in windows and at fairs, club camps, and expositions throughout the State. In many communities in Indiana where stem rust has been severe for many years, barberries have been found and destroyed, and today these communities are remarkably free from stem-rust damage. In general the public is sympathetic toward the campaign but by no means thoroughly educated regarding the details. Much remains to be done in the field of both survey and education.

During the calendar year 1929, 223 bushes were found on 52 properties. Nineteen field agents were engaged in the second survey of Hamilton, Tipton, and Montgomery Counties. Some work was done in an area of escaped bushes in Henry County.

Closer cooperation has been effected with the departments of botany of the colleges and universities of the State. Laboratory materials, bulletins, and colored plates have been supplied to these departments.

Talks on barberry eradication were made at all of the boys' and girls' club camps. One man was employed during the school year to talk on barberry eradication in the high schools. It will take four years to complete this program in the 825 high schools of the State. Newspaper publicity and demonstrations were stressed as in former years. Circular letters and bulletins were sent to all rural-route box holders in territory being second surveyed.

Conclusion

Common barberry spreads black stem rust to wheat, oats, rye, barley, and certain grasses. It causes an average annual loss of about 300,000 bushels of grain in Indiana alone. In many communities where stem rust had been

causing damage for many years, barberries have been found and destroyed, and since that time stem rust has caused no commercial damage.

Common barberry has escaped from cultivation in all parts of the State. If allowed to grow unhindered, producing seeds and multiplying as in the past, it would no doubt soon become a common wild shrub and black stem rust would be the limiting factor in the production of small grains.

Barberry eradication is both an immediate relief measure and a future protective measure necessary for the safeguarding of present and future grain crops against the ravages of black stem rust.

The successful continuation of the barberry-eradication campaign in Indiana depends upon careful and persistent field work, a definite educational program, and the cooperation of the people of the State.

Every citizen should learn to know the common barberry (Berberis vulgaris L.), which is a tall, erect shrub, usually 5 to 10 feet high. In Indiana it often attains a height of 15 to 20 feet. The bark is gray, but the wood of both stems and roots is bright yellow in color. Spines occur along the branches in groups of three or more. The leaves are produced normally in clusters, always have saw-toothed or bristle-like edges, and may be either green or reddish purple in color. The small yellow flowers are inconspicuous. The oblong berries, which are produced in drooping clusters like currants, readily attract attention after they turn red in the late summer and fall.

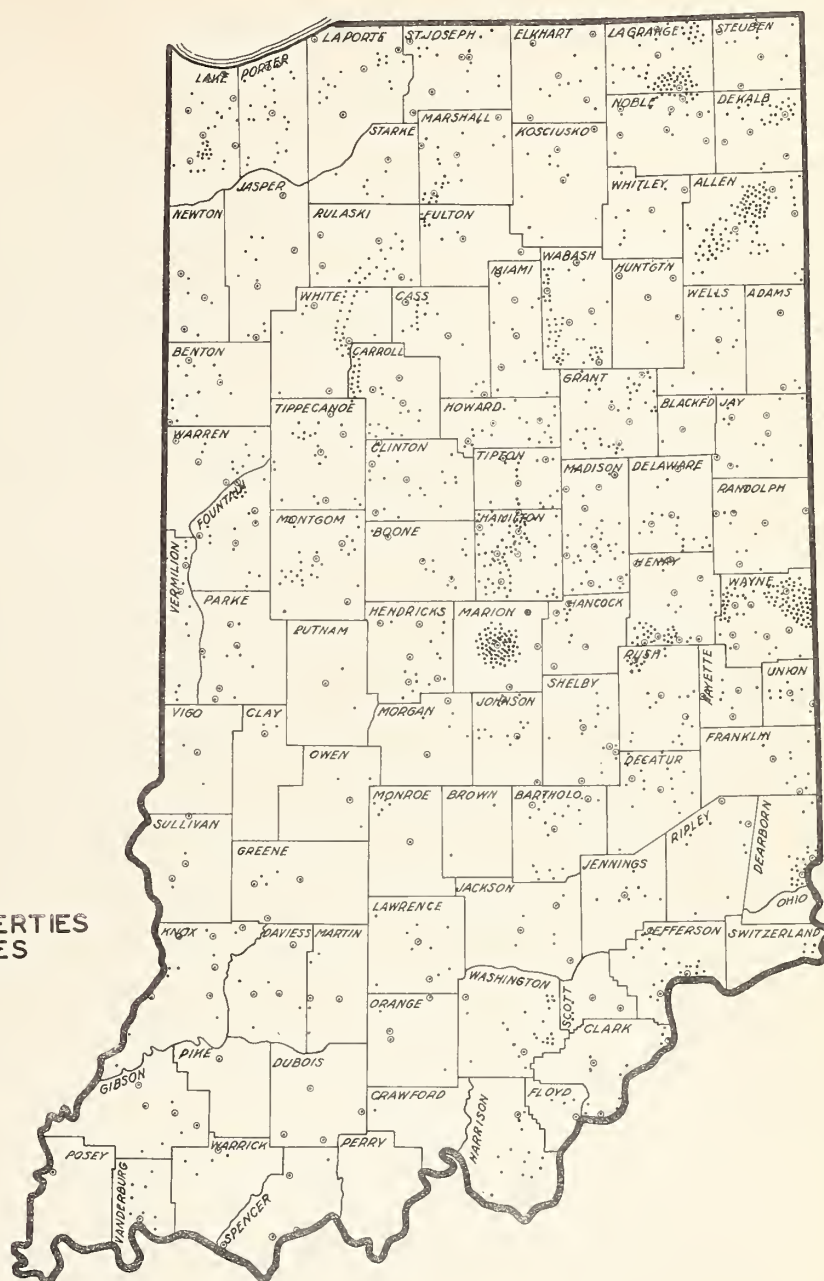
Not all barberries are harmful. The Japanese barberry (Berberis thunbergii DC.) does not spread stem rust, and its use for landscaping may be encouraged. It is easily recognized by its low and gracefully spreading habit of growth, and it is seldom more than 4 or 5 feet high. The bark is reddish, and the small spines along the branches are usually single but occasionally are in groups of three. The leaves are always smooth along the edges and may be either reddish purple or green. The small yellowish flowers are inconspicuous. The oval berries are produced along the stems singly or in groups of two or three like gooseberries. The berries turn bright red in the late summer and fall, adding materially to the beauty of the landscape. As a rule, many of the berries remain on the bushes until spring.

Please report all bushes which you think may be common barberry to the Office of Barberry Eradication, Purdue Agricultural Experiment Station, Lafayette, Ind.

PROPERTIES HAVING BARBERRY BUSHES 1918-1929

INDIANA

5,272 PROPERTIES
243,594 BUSHES



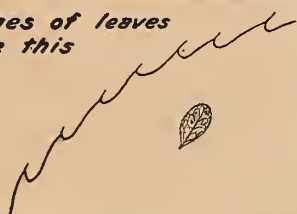
- FARMS HAVING BARBERRY BUSHES
- TOWNS HAVING BARBERRY BUSHES

Common Barberry Spreads Black Stem Rust

Know Common Barberry Look For It!

*When you find
a spiny bush
with-*

*Edges of leaves
like this*



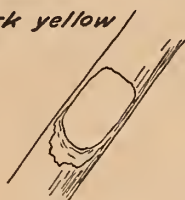
Spines like these



Berries like these



Inner bark yellow



*It is a
Common Barberry
and should be
reported at once*

*Spread of
Barberries by
birds*

*Birds eat the
berries*



*Carry them to their
roosting places*



*Where they cough
up the seeds*



*From which seedling
bushes grow*



*They in time
bear fruit which
is again carried
farther on*

Look For and Report All Common Barberry Bushes

To the State Leader of Barberry Eradication, in care of your State Department of Agriculture or your State Agricultural College.

Common Barberry Bushes

spread

Black Stem Rust

to

WHEAT, OATS,
BARLEY, RYE,
and Many Wild
Grasses

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